

# Preparing for the Impacts of Climate Change in California: How Ready is the Coastal Sector?

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# Overview

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- Challenges along the CA coast today
- The changing societal ability to deal with climate variability and change
- Conceptual framework for thinking about adaptive capacity
- Methods
- Results and Discussion
- Conclusions



# Definition of Key Concepts

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- **Mitigation**—The reduction of heat-trapping greenhouse gas emissions into the atmosphere.
- **Adaptation**—The range of adjustments of the environment or those taken by individuals, organizations, communities, or other entities to deal with the potential or experienced impacts of climate change.
- **Vulnerability**—The extent to which a natural or social system is susceptible to sustained damage from weather extremes, climate variability, and change (and other interactive stressors).
- **Adaptive Capacity**—The ability of a system to anticipate and adapt to the potential or experienced impacts of climate change. Sometimes equated with and other times distinguished from **Coping Capacity**—the ability of a system to deal with the impacts of present-day weather extremes or climate variability.
- **Resilience**—The ability of a system to absorb and rebound from the impacts from weather extremes, climate variability, or change and to continue functioning.

# Case Study: California Coastal Sector

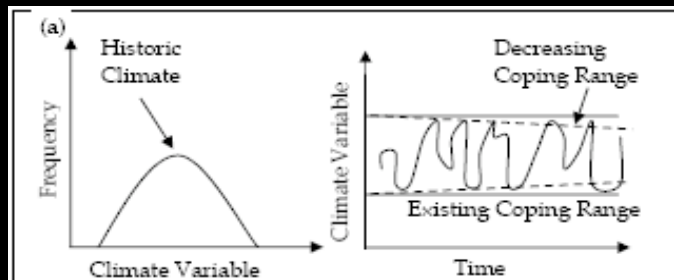
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- 1,100 miles of coastline
  - major attractor for development, economic activity, tourism, and recreation
  - critically at risk from the combined impacts of climate change
- Projected impacts from climate change
  - Sea-level rise
  - Changing coastal storms
  - Increasing coastal erosion, flooding, cliff retreat
  - Changing rainfall and runoff patterns into the coastal ocean, increases in coastal water temperatures
  - Species shifts
  - Higher air and water temperatures

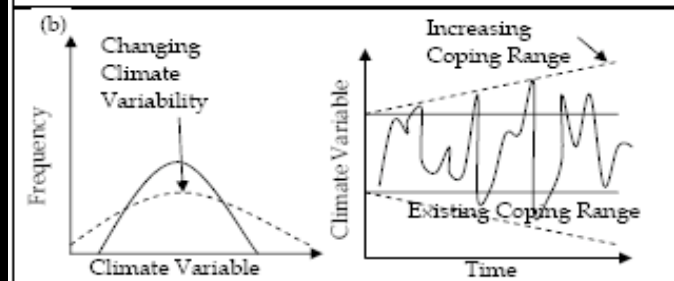
# Climate Variability and Change vs. Coping Range

Historic climate variability



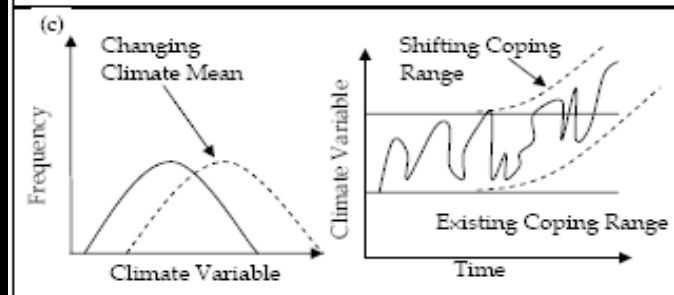
Decreasing coping range

Changing climate variability



Increasing coping range

Changing climate averages and shift in variability



Shifting coping range

MITIGATION



REDUCTION OF IMPACTS



ADAPTATION

Source: Graphic representation based on Smit and Pilifosova 2003; Burton et al. 1993

# Awareness—Analysis—Action: The AAA of Adaptation

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## ■ Awareness

- Do you know how climate change could impact your area, sector?

## ■ Analysis

- Can you identify and assess the risks from climate change to your services, operations?

## ■ Action

- Do your current policies, strategies, and plans include provisions for the impacts of climate change?
- Are developments with a lifetime of more than 20 years required to factor in climate change?
- Does your Emergency Planning Service take into account climate change?
- Are you addressing climate change in your local community strategy or community plan?
- Have you briefed your elected members on any key risks arising from climate variability and long-term climate change?

# Data Sources

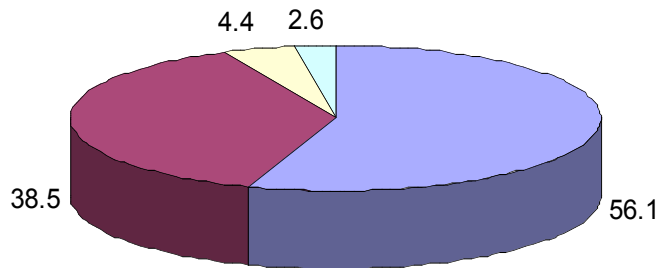


- Interviews with 16 state, regional, and federal coastal managers
  - Mostly by phone
  - Average length: 70 minutes
- Comprehensive mail survey to 298 municipal and county “coastal managers”
  - 18-page, pre-tested survey
  - 44.5% overall response rate, 114 useable responses (39%)\*
  - 83% of cities, 77% of counties\*
- Key questions asked:
  - Current coastal management challenges
  - Attitudes and knowledge about global warming
  - Expected impacts of GW
  - Efforts to deal with impacts of GW
  - Information use and needs
  - Background on state, municipality, county, respondent

(\* preliminary data)

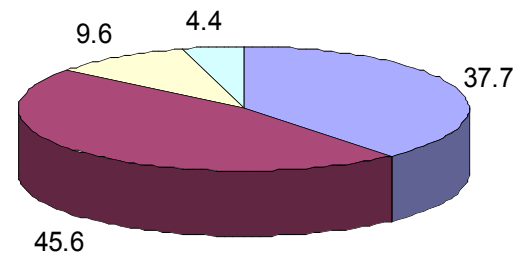
# Awareness

**Global warming is real and already happening**



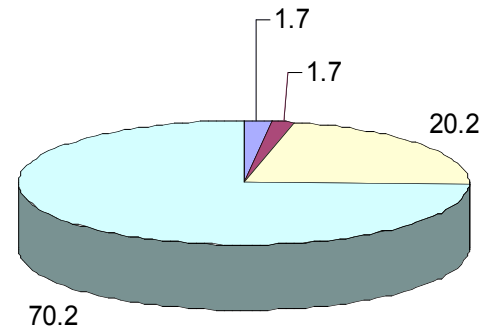
Strongly agree Slightly agree Slightly disagree Strongly disagree

**Global warming is probably happening and we'll start seeing impacts soon**



Strongly agree Slightly agree Slightly disagree Strongly disagree

**Global warming is probably not happening now and will not cause problems in the future**

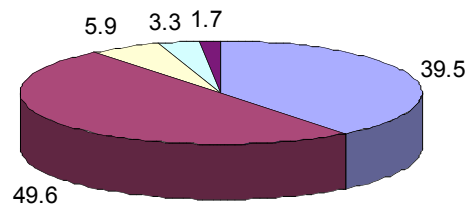


Strongly agree Slightly agree Slightly disagree Strongly disagree



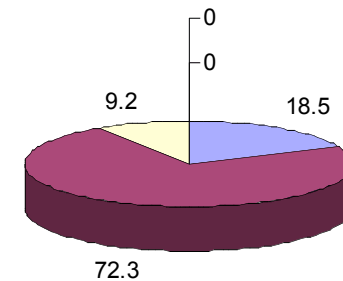
# Concern & Knowledge

What is your personal level of concern about Global Warming?



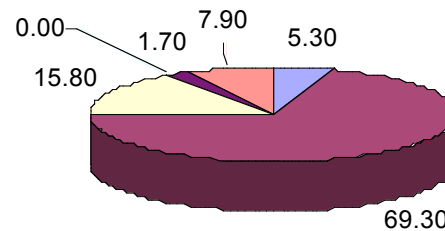
Very concerned Concerned Neutral Not very concerned Not concerned at all

How well informed do you feel about global warming?



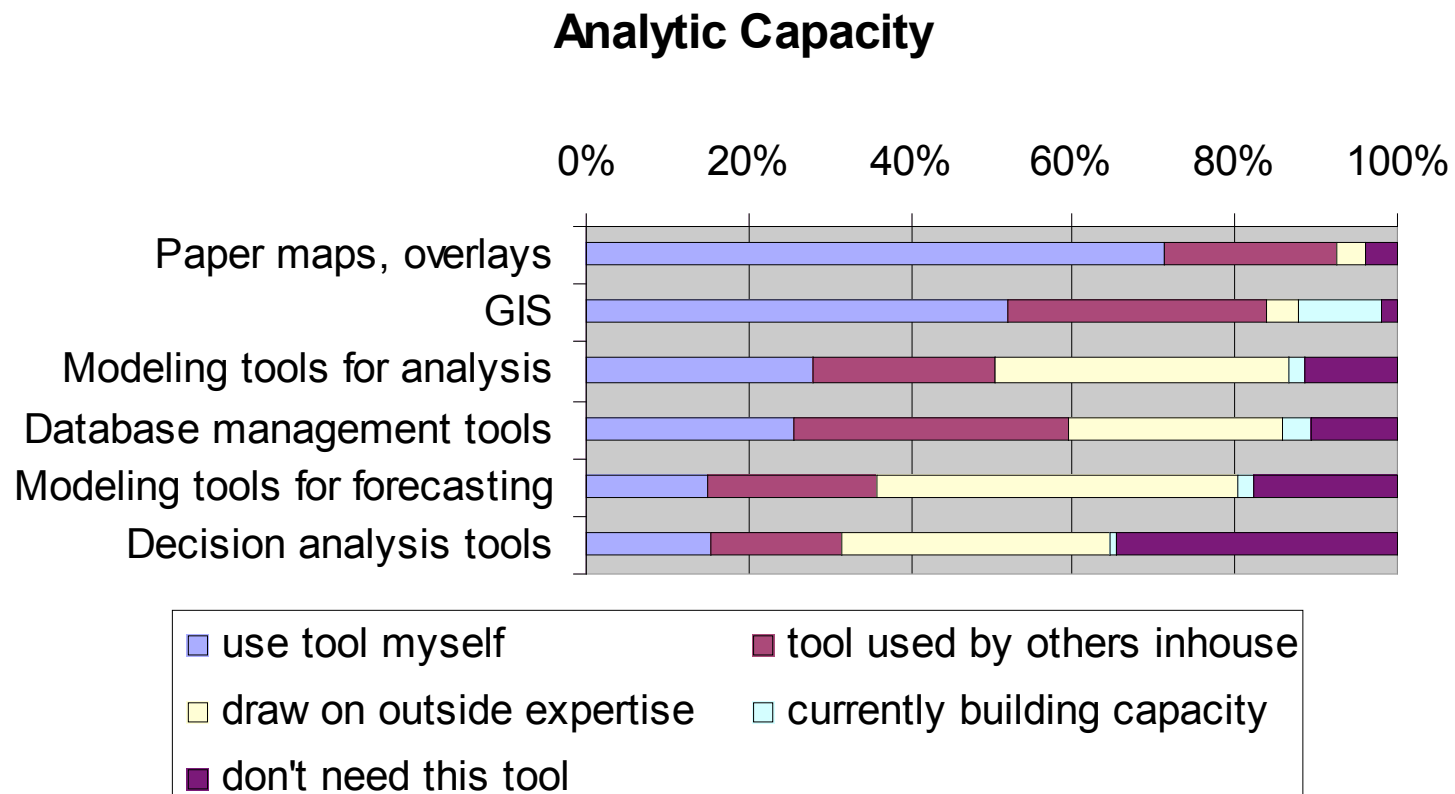
Well informed Moderately informed Not well informed Not at all informed Don't know

Preparing for change?



We should prepare for the possibility of increased problems in coastal areas in all our decisions  
 We should prepare for the most likely scenario  
 We should wait to act until we have better information  
 I am not willing to act now  
 I won't take action until I get clear guidance and leadership  
 I can't take action because I have too much else on my plate

# Analytic Capacity



# Information Needs

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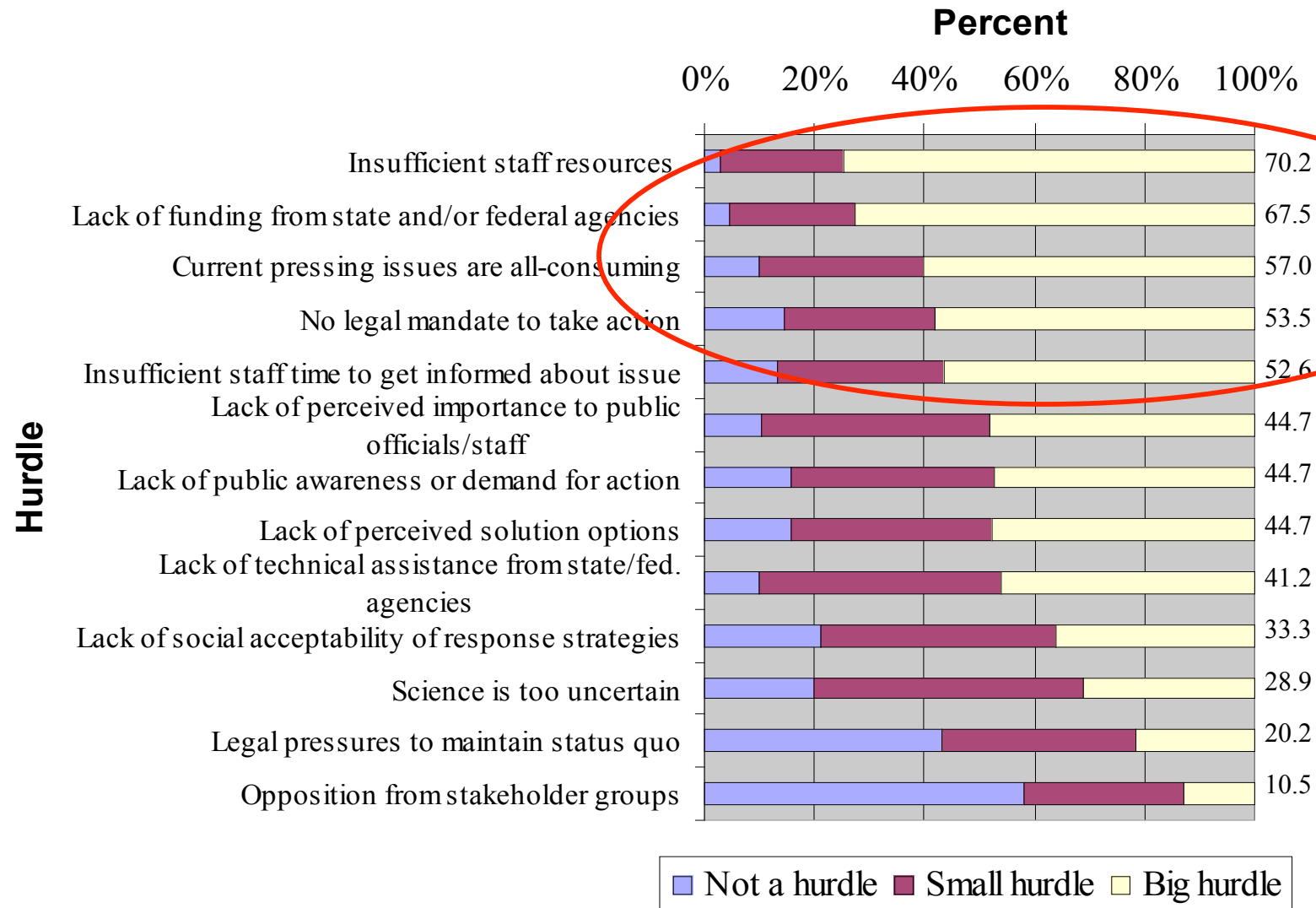
- Perceived usefulness of information (Average score on scale from 1-4)
  - Weather and seasonal climate forecasts 2.9
  - Climate change projections for next few yrs 2.7
  - Vulnerability assessment of community 3.4
  - Specific projections of climate variables (e.g., temp, precip, SLR, etc.) 3.3
- Desirable opportunities to learn more
  - Hands-on training 2.9
  - User manuals 2.6
  - Conferences 2.6
  - Better college education 2.5
  - Web-based clearing houses 2.8
  - Dedicated listserves 2.5
  - Better in-house sharing 2.3

# Actions Taken/Not Taken

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- Only 2 counties have plans in place that consider the impacts of climate change; neither considers coastal impacts
  - San Luis Obispo Co.
  - Santa Rosa Co.
- 3 cities and 3 counties are currently preparing such plans, 2 each consider coastal impacts
  - Solana Beach                      Contra Costa Co.
  - Goleta                                Sonoma Co.
  - Palo Alto                             Humboldt Co.
- 87 respondents said they had no plans
- 21 respondents didn't know

# Perceived Hurdles to Action on Global Warming



# Implications & Discussion

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- Data limitations
  - Self-selection out of survey
    - if not interested/not working on CC impacts
    - if not considering oneself a “coastal manager”
    - if not considering oneself an expert in all areas of coastal management
- Not working under a climate change policy framework explicitly does not mean state/local governments are entirely unprepared or unable to deal with some of the impacts of climate change
- BUT: Data suggests that
  - At state level: considerable expertise, variable motivation
  - Local CA coastal managers are insufficiently prepared to deal with impacts, are mostly not forward looking, struggling to deal with current problems, have very little extra capacity for CC.

# Conclusions

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- **Awareness, Knowledge, Concern, Willingness to Act**
  - High
- **Analytic Capacity**
  - Moderate
  - Constrained by resource and staff limitations
- **Actions (and Barriers to Action)**
  - No existing local plans currently account for CC impacts
  - Several local plans with coastal consideration are in preparation at present
  - Local communities have very specific information and support needs, in particular staffing, state and federal resources, mandate, and help with ongoing problem burden

# Thank you!

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